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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/639,674	08/10/2000	Kuang-Shyr Wu	TD0044CH	1587

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W Wayne Liauh Ph D J D
Law Office of Liauh and Associates
Ste 5 388
4224 Waialae Ave
Honolulu, HI 96816

EXAMINER

MILLER, RYAN J

ART UNIT	PAPER NUMBER
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2621

DATE MAILED: 01/15/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/639,674

Applicant(s)

WU, KUANG-SHYR

Examiner

Ryan J. Miller

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 October 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7, 9 and 10 is/are pending in the application.
- 4a) Of the above claim(s) 8 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-5 and 10 is/are rejected.
- 7) ☒ Claim(s) 6, 7 and 9 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 8/10/00 and 10/24/03 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

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DETAILED ACTION

1. The amendment received on October 24, 2003 has been entered in full. Claims 1-7, 9, and 10 are pending in this application. Claim 8 has been withdrawn and will not be considered by the examiner; however, the examiner requests that this claim be cancelled since no restriction requirement was presented. The following action is non-final.

Response to Arguments

2. Applicant's arguments filed on October 24, 2003 have been fully considered and a discussion regarding these arguments is presented below.

Drawing Objections

Summary of Argument: The applicant argues that the objections to the drawings should be withdrawn in light of the changes presented in the substitute specification.

Examiner's Response: The examiner agrees. The objection to the drawings has been withdrawn.

35 U.S.C. 112, First and Second Paragraph Rejections

Summary of Argument: The applicant argues that changing the word "spin" to convolutional and the word "cross" to interleaving in both the specification and the claims removes the ambiguities that existed in the original disclosure. The 35 U.S.C. 112, first and second paragraph rejections should now be deemed moot.

Examiner's Response: The examiner agrees. The 35 U.S.C. 112, first and second paragraph rejections have been withdrawn.

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Prior Art Rejections

35 U.S.C. 102(b) rejections

Summary of Argument: The applicant argues that many of the key elements of the present invention are not taught in Acharya et al. (U.S. Patent No. 6,449,380 B1).

Examiner's response: Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

35 U.S.C. 103(a) rejections

Summary of Argument: The applicant argues that since claim 1 is allowable, claims 2-7 and 9-10 are also allowable since these claims depend from claim 1.

Examiner's response: Applicant's arguments have been considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 1, 2, and 5 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Acharya et al. (U.S. Patent No. 6,449,380 B1) and Cox et al. (U.S. Patent No. 6,275,965 B1), and further in combination with Reed et al. (U.S. Patent No. 6,590,996 B1).

As applied to claim 1, Acharya et al. discloses an information hiding method with reduced fuzziness, which comprises the steps of: inputting the information to be embedded into a convolutional encoder and generating encoded information whose length is a multiple of the

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original information (see column 4, lines 10-18: The reference describes that watermark signal information B, which is a 32x32 block, is encrypted into a bit stream $E(B)=N_0N_1N_2N_3\ldots N_m$, where each N represent a byte in the encrypted block E(B). The original watermark information B has a length of 32 bits, where as the encrypted block E(B) will have a length of 8m bits since each N is a byte, which consists of 8 bits. Therefore, the length of the encoded information (i.e. E(B)) is a multiple of the original information (i.e. B). The output of a convolutional encoder is a multiple of the input. Therefore, the process performed in this reference is performed by a convolutional encoder.); generating a random number sequence using an encoding for permuting the encoded information, the seed of the random numbers being a first key (see column 4, lines 20-25: The reference describes that E(B) is the binary digital signal representation of the encrypted block.); selecting a pixel of a host image using a random number generator as an information embedding point of the encoded information, the seed of the random number generator being a second key (see column 4, lines 34-65: The reference describes the use of a pseudo-random number generation technique to select a pixel location of the compressed image to embed the encrypted block E(B). This technique uses the value Q as described by equation [2] as the seed, and, therefore, the second key.); and embedding the encoded information into the pixel of the host image (see column 4, lines 47-49: The reference describes that the encoded watermark signal (i.e. encoded information) is combined (i.e. embedded in) the compressed image (i.e. host image) based on the pixel location obtained from the pseudo-random number generation technique).

As applied to claim 2, Acharya et al. discloses that the spin encoding corrects transmission errors or human damages on the encoded information (see column 3, lines 38-44:

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The reference describes that the watermark signal can be blended with the image in a perceptually non-detectable manner (i.e. corrects human damages).).

As applied to claim 5, Acharya et al. discloses extracting the embedded information: using the second key to compute the embedding positions of the encoded information (see column 6, lines 13-17: The reference describes that the pseudo-random process is applied to the seed (i.e. the second key) to determine the location of the embedded information in the compressed image.); using the first key to reconstruct the encoded information and to restore the order before cross encoding; and decoding the encoded information using spin decoding (see column 6, lines 17-22: The reference describes that after all of the bytes of the encrypted watermark have been extracted, they can be concatenated (i.e. reconstructed) to provide $E(B)$. Once $E(B)$ is determined, the original watermark information B can be obtained.).

Claim 1 calls for the use of A) an interleaving encoder for permuting the encoded information and B) embedding the encoded information into a B channel of the host image. These elements are absent from Acharya et al.

Regarding difference A), Cox et al. discloses the use of an interleaving encoder for permuting data (see column 11, line 66 – column 12, line 16: The reference describes an interleaving encoder that redistributes (i.e. permutes) the data.).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Acharya et al. by adding the use of an interleaving encoder as taught in Cox et al. because the use of such an encoder allows for the “extension of] the number of interleaved subblocks” (see Cox et al.: column 3, lines 4-5). This extension allows for a more robust overall cryptographic system.

Regarding difference B), Reed et al. discloses embedding information into a B channel of the image (see column 35, lines 44-53: The reference describes watermarking an image in the B channel.).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify Acharya et al. by embedding information in the B channel of an image as taught in Reed et al. because “the eye is about a fifth less sensitive to high frequencies in blue-yellow than red-green” (see Reed et al.: column 35, lines 36-38). Therefore, the embedded information will be more difficult to detect with the naked eye.

5. Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Acharya et al. (U.S. Patent No. 6,449,380 B1), Cox et al. 6,275,965 B1), and Reed et al. (U.S. Patent No. 6,590,996 B1), as applied to claim 1 above, and further in combination with Schulz (U.S. Patent No. 4,905,176).

Claim 3, calls for the random number sequence to be generated by a linear feedback shift register. Although the combination of Acharya et al., Cox et al., and Reed et al. discloses the use of random number generation, the combination does not teach the use of a linear feedback shift register. However, Schulz et al., in the same problem solving area of random number generation, does disclose the use of such a device (see Fig. 1: This figure shows a linear feedback shift register 20 used as a random number generator.).

As applied to claim 4, Schulz et al. discloses that the linear feedback shift register comprises a plurality of buffers (see Fig. 1: The figure shows that the linear feedback shift register comprises 1-n shift register stages (i.e. a plurality of buffers.).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combination of Acharya et al., Cox et al., and Reed et al. by adding the use of a linear feedback shift register to generate the random numbers as taught in Schulz because the use of such a device “produces unpredictable sequences of pseudo-random numbers which prevent an attacker from anticipating subsequent values in the output bit stream” (see Schulz: column 8, lines 48-51). Therefore, the use of such a device will add robustness to the watermarking system.

6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Acharya et al. (U.S. Patent No. 6,449,380 B1), Cox et al. 6,275,965 B1), and Reed et al. (U.S. Patent No. 6,590,996 B1), as applied to claim 1 above, and further in combination with Ramaswamy (U.S. Patent No. 5,966,412 A).

Claim 10 calls for the spin decoding to adopt the Viterbi algorithm. The combination of Acharya et al., Cox et al., and Reed et al. does not disclose the use of a Viterbi algorithm; however, Ramaswamy does disclose the use of such an algorithm (see column 5, lines 5-10: The reference describes using a Viterbi decoder).

It would have been obvious to a person of ordinary skill in the art at the time the invention was made to modify the combination of Acharya et al., Cox et al., and Reed et al. by adding the use of the Viterbi algorithm as taught by Ramaswamy because the use of such an algorithm is “able to error correct corrupted bit streams” (see Ramaswamy: column 5, line 9). Therefore, the use of a Viterbi algorithm will provide more accurate retrieval of the encoded information since the process is able to correct errors in corrupted information.

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Allowable Subject Matter

7. Claims 6, 7, and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

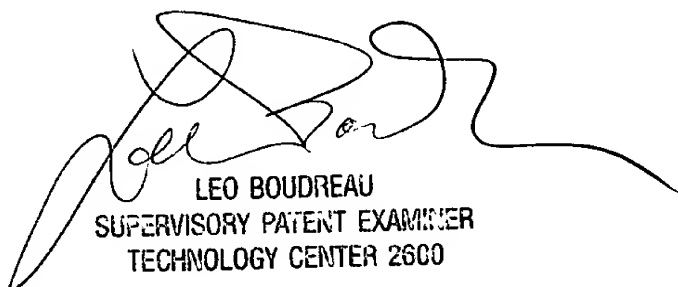
8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ryan J. Miller whose telephone number is (703) 306-4142. The examiner can normally be reached on M-F 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Leo H. Boudreau can be reached on (703) 305-4706. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4750.


Ryan J. Miller

Ryan J. Miller
Examiner
Art Unit 2621


LEO BOUDREAU
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600